

Sequence Listing

(1) GENERAL INFORMATION:

(i) APPLICANT: Garrard, Lisa J.
Henner, Dennis J.
Bass, Steven
Greene, Ronald
Lowman, Henry B.
Wells, James A.
Matthews, David J.

(ii) TITLE OF INVENTION: ENRICHMENT METHOD FOR VARIANT PROTEINS WITH
ALTERED BINDING PROPERTIES

(iii) NUMBER OF SEQUENCES: 43

(iv) CORRESPONDENCE ADDRESS:

(A) ADDRESSEE: Genentech, Inc.
(B) STREET: 1 DNA Way
(C) CITY: South San Francisco
(D) STATE: California
(E) COUNTRY: USA
(F) ZIP: 94080

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: 3.5 inch, 1.44 Mb floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: WinPatin (Genentech)

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER:
(B) FILING DATE: 21-Nov-2000
(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 08/922345
(B) FILING DATE: 03-SEP-1997

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 08/463587
(B) FILING DATE: 05-JUN-1995

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 08/050058
(B) FILING DATE: 30-APR-1993

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: PCT/US91/09133
(B) FILING DATE: 03-DEC-1991

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 07/743614
(B) FILING DATE: 09-AUG-1991

- (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 07/715300
(B) FILING DATE: 14-JUN-1991
- (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 07/683400
(B) FILING DATE: 10-APR-1991
- (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 07/621667
(B) FILING DATE: 03-DEC-1990
- (viii) ATTORNEY/AGENT INFORMATION:
(A) NAME: Schwartz, Timothy R.
(B) REGISTRATION NUMBER: 32171
(C) REFERENCE/DOCKET NUMBER: P0645P4D2C3

- (ix) TELECOMMUNICATION INFORMATION:
(A) TELEPHONE: 650/225-7467
(B) TELEFAX: 650/952-9881

(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 36 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

GGCAGCTGTG GCTTCTAGAG TGGCGGCGGC TCTGGT 36

(2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 36 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

AGCTGTGGCT TCGGGCCCTT AGCATTTAAT GCGGTA 36

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

TTCACAAACG AAGGGCCCTT AATTAAAGCC AGA 33

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 30 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

CAATAATAAC GGGCTAGCCA AAAGAACTGG 30

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 24 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

CACGACAGAA TTCCCGACTG GAAA 24

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 23 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

CTGTTTCTAG AGTGAAATTG TTA 23

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

ACATTCTGCTGG GTACCGTGCA G 21

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 63 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single

(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

GCTTCAGGAA GGACATGGAC NNSGTCNNSA CANNSTGNN SATCGTGCGAG 50

TGCCGCTCTG TGG 63

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 24 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

AAGGTCTCCA CATACTGAG GATC 24

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 33 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

ATGGACAAGG TGTCGACATA CCTGCGCATC GTG 33

(2) INFORMATION FOR SEQ ID NO:11:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 36 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

GGCAGCTGTG GATTCTAGAG TGGCGGTGGC TCTGGT 36

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 12 amino acids
 - (B) TYPE: Amino Acid
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Gly Ser Cys Gly Phe Glu Ser Gly Gly Ser Gly
1 5 10

(2) INFORMATION FOR SEQ ID NO:13:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

CGGACTGGGC AGATATTCAA GCAGACC 27

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 38 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

CTCAAGAACT ACGGGTTACC CTGACTGCTT CAGGAAGG 38

(2) INFORMATION FOR SEQ ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

CGCATCGTGC AGTGCAGATC TGTGGAGGGC 30

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 66 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

GTTACTCTAC TGCTTTCAGG AAGGACATGG ACNNSGTCNN SACANNSTG 50
NNSATCGTGC AGTGCA 66

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 64 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

GATCTGCACT GCACGATSNN CAGSNNTGTS NNGACSNNGT CCATGTCCTT 50
CCTGAAGCAG TAGA 64

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 25 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

GCCTTTGACA GGTACCAGGA GTTTG 25

(2) INFORMATION FOR SEQ ID NO:19:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

CCAACTATAC CACTCTCGAG GTCTATTGTA TAA 33

(2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 66 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

TCGAGGCTCN NSGACAACGC GNNSTGCGT GCTNNSCGTC TTNNSCAGCT 50
GGCCTTTGAC ACGTAC 66

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 58 base pairs

- (B) TYPE: Nucleic Acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

GTGTCAAAGG CCAGCTGSNN AAGACGSNNA GCACGCAGSN NCGCGTTGTC 50
SNNGAGCC 58

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 65 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

GTTACTCTAC TGCTTCNSA AGGACATGNN SAAGGTCAGC NNSTACCTGC 50
GCNNSGTGCA GTGCA 65

(2) INFORMATION FOR SEQ ID NO:23:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 64 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

GATCTGCACT GCACSNNGCG CAGGTASNNG CTGACCTTSN NCATGTCCTT 50
SNNGAAGCAG TAGA 64

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 2178 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

ATGAAAAAGA ATATCGCATT TCTTCTTGCA TCTATGTTTCG TTTTTTCTAT 50
TGCTACAAAC GCGTACGCTG ATATCCAGAT GACCCAGTCC CCGAGCTCCC 100
TGTCCGCCTC TGTGGGCGAT AGGGTCACCA TCACCTGCCG TGCCAGTCAG 150

GATGTGAATA CTGCTGTAGC CTGGTATCAA CAGAAACCAG GAAAAGCTCC 200
 GAAACTACTG ATTTACTCGG CATCCTTCCT CTA CTCTGGA GTCCCTTCTC 250
 GCTTCTCTGG ATCCAGATCT GGGACGGATT TCACTCTGAC CATCAGCAGT 300
 CTGCAGCCGG AAGACTTCGC AACTTATTAC TGTCAGCAAC ATTATACTAC 350
 TCCTCCCACG TTCGGACAGG GTACCAAGGT GGAGATCAAA CGAACTGTGG 400
 CTGCACCATC TGTCTTCATC TTCCCGCCAT CTGATGAGCA GTTGAAATCT 450
 GGAAGTGCCT CTGTTGTGTG CCTGCTGAAT AACTTCTATC CCAGAGAGGC 500
 CAAAGTACAG TGGAAGGTGG ATAACGCCCT CCAATCGGGT AACTCCCAGG 550
 AGAGTGTAC AGAGCAGGAC AGCAAGGACA GCACCTACAG CCTCAGCAGC 600
 ACCCTGACGC TGAGCAAAGC AGACTACGAG AACACAAAG TCTACGCCTG 650
 CGAAGTCACC CATCAGGGCC TGAGCTCGCC CGTCACAAAG AGCTTCAACA 700
 GGGGAGAGTG TTAAGCTGAT CCTCTACGCC GGACGCATCG TGGCCCTAGT 750
 ACGCAAGTTC ACGTAAAAAG GGTATCTAGA GGTGAGGTG ATTTTATGAA 800
 AAAGAATATC GCATTTCTTC TTGCATCTAT GTTCGTTTTT TCTATTGCTA 850
 CAAACGCGTA CGCTGAGGTT CAGCTGGTGG AGTCTGGCGG TGGCCTGGTG 900
 CAGCCAGGGG GCTCACTCCG TTTGTCCTGT GCAGCTTCTG GCTTCAACAT 950
 TAAAGACACC TATATACT GGGTGCGTCA GGCCCCGGGT AAGGGCCTGG 1000
 AATGGGTTGC AAGGATTTAT CCTACGAATG GTTATACTAG ATATGCCGAT 1050
 AGCGTCAAGG GCCGTTTCAC TATAAGCGCA GACACATCCA AAAACACAGC 1100
 CTACCTGCAG ATGAACAGCC TCGTGCTGA GGACACTGCC GTCTATTATT 1150
 GTTCTAGATG GGGAGGGGAC GGCTTCTATG CTATGGACTA CTGGGGTCAA 1200
 GGAACCTGG TCACCGTCTC CTCGGCCTCC ACCAAGGGCC CATCGGTCTT 1250
 CCCCCTGGCA CCCTCCTCCA AGAGCACCTC TGGGGGCACA GCGGCCCTGG 1300
 GCTGCCTGGT CAAGGACTAC TTCCCGAAC CGGTGACGGT GTCGTGGAAC 1350
 TCAGGCGCCC TGACCAGCGG CGTGACACACC TTCCCGGCTG TCCTACAGTC 1400
 CTCAGGACTC TACTCCCTCA GCAGCGTGGT GACTGTGCCC TCTAGCAGCT 1450
 TGGGCACCCA GACCTACATC TGCAACGTGA ATCACAAGCC CAGCAACACC 1500
 AAGGTGGACA AGAAAGTTGA GCCCAAATCT TGTGACAAAA CTCACACAGG 1550
 GCCCTTCGTT TGTGAATATC AAGGCCAATC GTCTGACCTG CCTCAACCTC 1600

CTGTCAATGC TGGCGGCGGC TCTGGTGGTG GTTCTGGTGG CGGCTCTGAG 1650
 GGTGGTGGCT CTGAGGGTGG CGGTTCTGAG GGTGGCGGCT CTGAGGGAGG 1700
 CGGTTCCGGT GGTGGCTCTG GTTCCGGTGA TTTTGATTAT GAAAAGATGG 1750
 CAAACGCTAA TAAGGGGGCT ATGACCGAAA ATGCCGATGA AAACGCGCTA 1800
 CAGTCTGACG CTAAAGGCAA ACTTGATTCT GTCGCTACTG ATTACGGTGC 1850
 TGCTATCGAT GGTTCATTG GTGACGTTTC CGGCCTTGCT AATGGTAATG 1900
 GTGCTACTGG TGATTTTGCT GGCTCTAATT CCCAAATGGC TCAAGTCGGT 1950
 GACGGTGATA ATTCACCTTT AATGAATAAT TTCCGTCAAT ATTTACCTTC 2000
 CCTCCCTCAA TCGGTTGAAT GTCGCCCTTT TGTCTTTAGC GCTGGTAAAC 2050
 CATATGAATT TTCTATTGAT TGTGACAAAA TAAACTTATT CCGTGGTGTC 2100
 TTTGCGTTTC TTTTATATGT TGCCACCTTT ATGTATGTAT TTTCTACGTT 2150
 TGCTAACATA CTGCGTAATA AGGAGTCT 2178

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 237 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Met	Lys	Lys	Asn	Ile	Ala	Phe	Leu	Leu	Ala	Ser	Met	Phe	Val	Phe	1	5	10	15
Ser	Ile	Ala	Thr	Asn	Ala	Tyr	Ala	Asp	Ile	Gln	Met	Thr	Gln	Ser	20	25	30	
Pro	Ser	Ser	Leu	Ser	Ala	Ser	Val	Gly	Asp	Arg	Val	Thr	Ile	Thr	35	40	45	
Cys	Arg	Ala	Ser	Gln	Asp	Val	Asn	Thr	Ala	Val	Ala	Trp	Tyr	Gln	50	55	60	
Gln	Lys	Pro	Gly	Lys	Ala	Pro	Lys	Leu	Leu	Ile	Tyr	Ser	Ala	Ser	65	70	75	
Phe	Leu	Tyr	Ser	Gly	Val	Pro	Ser	Arg	Phe	Ser	Gly	Ser	Arg	Ser	80	85	90	
Gly	Thr	Asp	Phe	Thr	Leu	Thr	Ile	Ser	Ser	Leu	Gln	Pro	Glu	Asp	95	100	105	
Phe	Ala	Thr	Tyr	Tyr	Cys	Gln	Gln	His	Tyr	Thr	Thr	Pro	Pro	Thr	110	115	120	

Phe Gly Gln Gly Thr Lys Val Glu Ile	Lys Arg Thr Val Ala Ala	125	130	135
Pro Ser Val Phe Ile Phe Pro Pro Ser	Asp Glu Gln Leu Lys Ser	140	145	150
Gly Thr Ala Ser Val Val Cys Leu Leu	Asn Asn Phe Tyr Pro Arg	155	160	165
Glu Ala Lys Val Gln Trp Lys Val Asp	Asn Ala Leu Gln Ser Gly	170	175	180
Asn Ser Gln Glu Ser Val Thr Glu Gln	Asp Ser Lys Asp Ser Thr	185	190	195
Tyr Ser Leu Ser Ser Thr Leu Thr Leu	Ser Lys Ala Asp Tyr Glu	200	205	210
Lys His Lys Val Tyr Ala Cys Glu Val	Thr His Gln Gly Leu Ser	215	220	225
Ser Pro Val Thr Lys Ser Phe Asn Arg	Gly Glu Cys	230	235	

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 461 amino acids
- (B) TYPE: Amino Acid
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Met Lys Lys Asn Ile Ala Phe Leu Leu Ala Ser Met Phe Val Phe	1	5	10	15
Ser Ile Ala Thr Asn Ala Tyr Ala Glu Val Gln Leu Val Glu Ser	20	25	30	
Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys	35	40	45	
Ala Ala Ser Gly Phe Asn Ile Lys Asp Thr Tyr Ile His Trp Val	50	55	60	
Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Arg Ile Tyr	65	70	75	
Pro Thr Asn Gly Tyr Thr Arg Tyr Ala Asp Ser Val Lys Gly Arg	80	85	90	
Phe Thr Ile Ser Ala Asp Thr Ser Lys Asn Thr Ala Tyr Leu Gln	95	100	105	
Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ser	110	115	120	

Ser	Val	Glu	Cys	Arg	Pro	Phe	Val	Phe	Ser	Ala	Gly	Lys	Pro	Tyr	410	415	420
Glu	Phe	Ser	Ile	Asp	Cys	Asp	Lys	Ile	Asn	Leu	Phe	Arg	Gly	Val	425	430	435
Phe	Ala	Phe	Leu	Leu	Tyr	Val	Ala	Thr	Phe	Met	Tyr	Val	Phe	Ser	440	445	450
Thr	Phe	Ala	Asn	Ile	Leu	Arg	Asn	Lys	Glu	Ser					455	460	

(2) INFORMATION FOR SEQ ID NO:27:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 48 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

TTCGGGCCCT TCGCTGCTCA CTATACGCGT CAGTCGACTG ACCTGCCT 48

(2) INFORMATION FOR SEQ ID NO:28:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

AGCTGTGGCT TCGGGCCCGC CGCCGCGTCG ACTGGCGGTG GCTCT 45

(2) INFORMATION FOR SEQ ID NO:29:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

AGCTGTGGCT TCGGGCCCGC CCCC GCGTCG ACTGGCGGTG GCTCT 45

(2) INFORMATION FOR SEQ ID NO:30:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 25 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

CTTCGCTGCT NNSNNSACCC GGCAA 25

(2) INFORMATION FOR SEQ ID NO:31:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 33 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

TCGATTGCCG GGTSNNSNNA GCAGCGAAGG GCC 33

(2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

GCTGCTCACT ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:33:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

GCTGCTCACA TGACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:34:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: Nucleic Acid
 - (C) STRANDEDNESS: Single
 - (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

GCTGCTCTCC ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:35:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

GCTGCTCTGC ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:36:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

GCTGCTCACA CCCGGCAA 18

(2) INFORMATION FOR SEQ ID NO:37:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

GCTGCTNNNC ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

GCTGCTCACT ATACGCGTCA G 21

(2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

GCTGCTCAGC ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:40:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: Nucleic Acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

GCTGCTACGC ACACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:41:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: Nucleic Acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

GCTGCTCACT CCCGGCAA 18

(2) INFORMATION FOR SEQ ID NO:42:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: Nucleic Acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

GCTGCTCATC ATACCCGGCA A 21

(2) INFORMATION FOR SEQ ID NO:43:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: Nucleic Acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

GCTGCTCACT TCCGGCAA 18